

**Department of Environmental Management
Maui Wastewater Community Working Group Meeting VII
Thursday, May 10, 2010
Waikapu Community Center**

**Meeting Notes
Draft - June 24, 2010**

I. Welcome & Introductions

II. Agenda Review; Reminder re. Groundrules; Housekeeping

Because CWG members have expressed interest in water reuse projects on the mainland, a presentation by Craig Lekven will be added to the agenda.

There will be no June meeting.

Facilitator Leland Chang mentions that audience participation was allowed during last meeting's brainstorming because the request was for feedback on specific questions. Today, we will return to the usual format of having public comments at the end of the agenda.

- Russell Sparks: Brief lunchtime presentation by Russell and Darla White on coral reefs and ecology including but not limited to injection wells. May 25th, 1:00 p.m.; and if people want to talk, he will stay after the meeting. Site to be announces.

III. CWG IV Meeting Summary

There were no comments on the draft summary.

IV. DEM update

- Cheryl Okuma: Legal proceedings prevent discussion of certain aspects of two matters. However, the following update can be provided:

1. Kahului Facility and Injection Well proceedings before Maui Planning Commission
 - a. The matter has to do with replacement of two wells identified by a consultant's report. A one-one replacement to enable the facility to handle its designed capacity in terms of the flow. The concern was about overflow into the ocean because these wells are not operating at optimum level. The Maui Planning Commission upheld that the Planning Director's decision to exempt this project from an SMA.
2. Lahaina and tracer study
 - a. The County is not in violation.
 - b. The January, 2010 letter from EPA is "investigating possible discharge of pollutants to the coastal waters of the Pacific Ocean along the Kaanapali coast of

Maui.” In order to investigate this, EPA wants the County to do a tracer study to “assess the impact of the (facility’s) effluent on the coastal waters and determine compliance with the (Clean Water Act).

- c. As we are concerned with a deadline of April 26, 2010, the County responded. Since then, the County determined that EPA was open to discussing what they would have the County do; Cheryl informed EPA that the County was looking at how it could move forward on a tracer study. EPA was willing to look at what we presented to them, and we were and are in the process of doing that.
3. A Save Kahului Harbor flyer quotes Dr. Alan Tice, an infectious disease expert with the U.H. Medical School as suggesting that that staph is caused by wastewater. In speaking with Dr. Tice, he told Cheryl that: a) he did not authorize the use of his name/quote in this flyer; b) there are a lot of misconceptions about staph; c) staph is not a sewage organism; d) staph cannot survive in seawater; e) the environment where staph grows and thrives is people; and f) staph is transmitted from human to human contact. Staph appears in hospitals, gyms, people’s use of others’ towels, etc; hygiene is an issue. Department of Health informs that information regarding staph can be found on the Center For Disease Control website.
 4. Budget Proceedings
 - a. DEM begins testing in accordance with the requirements for sampling and reporting under the Clean Water Act for the Lahaina Facility and shall submit a status report regarding this matter to the council by January 1, 2011. (DEM has been in discussions with EPA on how to move forward, as mentioned). No funding provided.
 - b. Under CIP project for Countywide Injection Well Rehabilitation it states that prior to expending these funds DEM shall work with DWS and private entities on a new verification study that provides the Council with future alternatives for the transmission and optimization of R-1 recycled water from the Kahului facility to provide a source of irrigation water for existing and planned future projects, and to provide alternatives to the use of injection wells. DEM is to transmit a status report regarding this matter by January 1, 2011. No funding provided.

- Steve Parabolicoli: Discussed Maui News letter to the editor. Water going down injection wells consistently meets R-2 standards; it is high quality. WW 101 a few months ago -- R1 is highest level recognized in HR 52. R2 has been used historically for reuse in Hawaii. Compared to raw sewage, it’s a tremendous reduction. Do have chlorine residential and enhance disinfection. Can use R2 water for contractor’s construction project, equipment wash down.

- Bob Pickering: What is standard for beach closure?

- Steve Parabolicoli: using another indicator like clostridium. We can get that information and will include it in recap of the minutes. Beach monitoring of enterococci -- 7 colony forming units (cfu) per 100 ml. for seawater; and clostridium -- less than 5 cfu/100ml. for marine environment. Fecal coliform is not used.

- Robin Knox: There’s information that staph is out in the population. Maui has greatest incidence of MRSA and staph. This is one of the effects of global warming. Recent research shows antibiotic resistance; and staph was found in beach sand and is recoverable from the

water. So there may be site specific situations. It is nationally recognized that indicator bacteria coming from intestines, but wastewater is complex.

- Craig Lekven (Brown and Caldwell): Presentation on water recycling success stories on the mainland. Craig asked other B&C water recycling engineers throughout the country for good program examples to share with the CWG. Mostly looked at programs outside of California, but B&C did a rate and fee study for the County of Maui in 1995 -- Appendix C in the report has a list of over 100 water recycling programs in California. Some are small towns where they irrigate dedicated crop land with wastewater for disposal purposes. The 1995 report is posted on the CWG website.

Tucson, Arizona: Program recycles up to 33 million gallons per day during the summer months. The driver for the program was water resources; over pumping of groundwater had led to land subsidence. Recycled water is used on golf courses, schools, parks, single family lots, and road medians. Note that recycled water use on single family lots is not allowed by Hawaii DOH. Program is financed with bonds, user rates, and fees. Program is subsidized by potable water rates and fees.

- Joie Taylor: What do they do with excess water? Do they use injection wells? What are their discharge standards?

- Craig Lekven: Tucson does not have injection wells; excess recycled water is discharged into a stream. The recycled water standards are comparable to the Hawaii recycled water standards. Uncertain as to what the discharge standards are, will obtain additional information.

Follow-up: The Tucson surface water discharge standards are 30 mg/L BOD and TSS, and 200 fecal coliform per 100 mL. These standards can be readily achieved with biological treatment followed by chlorination.

- Russell Sparks: How is the potable water subsidy structured?

- Craig Lekven: Uncertain how the structure is; it is one city government and chances are it is one common department.

Follow-up: Tucson Water Department delivers both potable and recycled water to its customers.

- Pam Daoust: Is R-1 water discharged into streams?

- Craig Lekven: It's R-1 quality water for reuse, but uncertain of the quality of discharge into the stream.

Follow-up: See information above; the discharge standards are less stringent than Hawaii R-1 recycled water standards.

- Pam Daoust: Any legal challenges due to this method? About environmental effects?

- Craig Lekven: He asked others in B&C for examples of programs that have failed for environmental and health reasons. Got no response to this question; no one indicated any failed programs. Water recycling is a beneficial activity. If recycled water is high in chlorides it can burn plants, and if it is high in sodium it can change the structure of clay soils.

- Joie Taylor: How much is not being reused?

- Craig Lekven: Without seasonal storage reservoirs typically up to about 70% of the annual flow can be reused. The example programs in Florida have climates comparable to Hawaii. During the hot summer months Tucson is likely using close to their entire flow. During the winter months there is little demand for recycled water and most is discharged to surface waters. In the Arizona desert it is likely that the stream discharge infiltrates and ultimately ends up in the groundwater.

Westminster, Colorado: The recycled water program driver is water supply needs; recycled water is a major part of the City's water portfolio. Ten percent of City's water supply need is obtained from recycled water. The types of reuse are similar to the Tucson program. The addition of recycled water to the City's water supply allowed the city to grow. Developers are required to put in recycled water infrastructure. The City also retrofitted existing areas for recycled water use. The program is funded by state revolving loans, plus user rates and fees. The potable water system subsidizes reuse program, similar to Tucson.

- Frank de Rego: 10% of potable water is recycled water?

- Craig Lekven: Recycled water is not used for potable uses. Of the total volume of water that the City uses 10 percent is recycled water used for irrigation purposes.

St. Petersburg, Florida: Excess recycled water is disposed via injection wells. Injection wells are commonly used in Florida, as in Hawaii. Injection wells are not commonly used in California due to the geology. Florida has geology that supports injection well use. St. Petersburg is located near Tampa Bay Florida. Back in 1970's legislation required advanced treatment for discharges into Bay. Instead of upgrade, they elected to upgrade to recycled water. This is big part of their water supply. Issues with chloride increase if over pump the groundwater for potable use.

- Pam Daoust: What is advanced treatment? Can we get that information?

- Craig Lekven: Suspects that it is stringent nitrogen and phosphorous limitations.

Follow-up: The Florida definition of advanced waste treatment is 5 mg/L BOD, 5 mg/L TSS, 3 mg/L total nitrogen, and 1 mg/L total phosphorus.

- Bob Pickering: Would it be more stringent than R-1.

- Craig Lekven: *Follow-up: Recycled water standards focus on turbidity and disinfection, and the Florida advanced waste treatment standards focus on nutrients, so they are different. A wastewater treatment system designed to meet the Florida advanced waste treatment standards may not necessarily be capable of meeting Hawaii R-1 requirements. The Florida advanced waste treatment standards represent the practical limits of available nutrient reduction technologies.*

- Robin Knox: The 1972 Clean Water Act established a minimum standard for secondary treatment; after enacting the Clean Water Act that the EPA continued to assess and monitor water bodies and started looking at non-point sources of pollution. Then they started developing water quality standards for bodies of water. Florida was ahead of the curve on this. They look at the water quality standard then look at the pipe discharge and come up with discharge permit requirements to meet the water quality standard. This is done under the NPDES program. For injection wells this is not done, because the concern is drinking water and therefore injection wells are regulated under the Safe Drinking Water Act. We in Hawaii are on cutting edge on this issue because of laws and how they are interpreted and we believe that the County's injection wells are subject to NPDES permits with water quality based controls. Whether required by law or not if you want to meet water quality goals there is a way to back calculate the discharge requirements needed to meet the goals.

- Shaun O'Keefe: So St. Petersburg is still injecting but upgraded their treatment?

- Craig Lekven: They had EPA grant funding for the treatment upgrade back in the 1970s. They chose at that time to upgrade for reuse rather than upgrade to discharge to Tampa Bay.

- Shaun O'Keefe: Did they need to address nutrients?

- Craig Lekven: The reuse standards do not address nutrients.
- Shaun O'Keefe: In terms of nutrients they are putting down the same thing in wells from when they started with reuse. Are there WQ problems with discharge into Bay?
- Craig Lekven: Needs to find out. *Follow-up: Tampa Bay discharge requirements are presented above. To create recycled water a treatment plant needs filtration and disinfection. Doesn't know the exact standard for injection and will need to find out.*
Follow-up: Generally, injection wells in Florida have to meet secondary treatment standards – BOD and TSS of 20 mg/L and basic disinfection. Basic disinfection essentially requires that the effluent after disinfection contain less than 200 fecal coliform per 100 mL. There is an exception – in several areas of the state (including St. Petersburg) there has been upwelling of wastewater discharged into deep injection zones into upper zones of the aquifer. The state passed legislation several years ago that requires these facilities to provide high level disinfection which in Florida is defined as fecal coliform be reduced below detection, TSS limit of 5 mg/L, and continuous monitoring of chlorine residual and turbidity and if limits are not achieved, effluent must be diverted to storage and retreated before discharging to the injection well.

Altamonte Springs, Florida: City has a 12.5 mgd water reclamation facility and uses 94 percent of the recycled water that is generated; the remainder is discharged to surface water. In Florida to get greater than about 70 percent use agencies either need to use supplemental water and have an abundance of land or have seasonal storage reservoirs to store water generated during the wet season for use during the dry season. Steve Parabolicoli described an ideal Maui scenario where golf courses pump supplemental brackish water for irrigation purposes when recycled water supplies are in high demand and then using only recycled water during the wet season when supplies are plentiful.

Irvine Ranch, California: Some Irvine Ranch buildings have dual plumbing systems for flushing toilets with recycled water. Chlorine residual in recycled water keeps toilet bowls cleaner than potable water. The original recycled water program driver was that the developer didn't have an ocean outfall for discharge, so they looked to water recycling for effluent management. Since then water issues have increased and Irvine Ranch Water District has enhanced their program by putting in seasonal storage reservoirs. They can store excess water produced during the wet season for use during the summer time. This increases the percentage of recycled water used annually.

LOTT Alliance, Washington: Located at the southern-most tip of Puget Sound. There are water quality concerns in Puget Sound and there were desires to halt discharges to surface water. Four agencies (Cities of Lacey, Olympia, Tumwater, and Thurston County) formed an alliance to construct and operate a treatment plant, constructed wetlands and groundwater recharge system. The capital costs were financed with SRF funds.

The constructed wetlands are set up as a park that the public can access. The constructed wetlands also serve to remove nutrients before the water is used to recharge groundwater. B&C has proposed this concept to Hawaii County on the Kona side of the Big Island.

- Robin Knox: You cannot use natural water bodies for treatment purposes. That's a distinction of constructed wetlands. You can construct wetlands for treatment, but cannot use existing wetlands for treatment purposes.
- Craig Lekven: Constructed wetlands are systems built outside of natural wetland systems.
- Howard Hanzawa: Cannot discharge into a stream; does EPA and DOH allow discharge of treated wastewater into dry gulch?
- Steve Parabolicoli: No, in Hawaii you are not allowed to discharge into state waterways including a dry gulch leading to ocean, or even an irrigation ditch. On the mainland this is allowed like in San Antonio Texas where the downtown riverwalk is fed with recycled water which then discharges into a water way.
- Howard Hanzawa: Does EPA allow it?
- Steve Parabolicoli: It's more a state decision.
- Robin Knox: It is allowed by EPA but needs to have water quality based limits that no existing treatment technology exists can meet. So that's why the State doesn't allow these discharges. There has to be enough dilution and mixing so that the beneficial uses of the water body are supported.
- Howard Hanzawa: Does EPA allow R1 discharge through outfall?
- Steve Parabolicoli/Robin Knox: Yes.
- Dave Taylor: All the other counties have outfalls...It is allowed by DOH/EPA.
- Robin Knox: That's an example of the goals. To have ocean outfall need to have zone of mixing and meet the water quality standards. Honolulu must meet higher standards in water quality. Requirements may change over time. There's only 3 ways to get rid of this stuff.
- Dave Taylor: General statements about the research you did. We use sewer rates to pay back, subsidize reuse with sewer rates. Do others have different financing models.
- Craig Lekven: Wastewater agencies around the country do about the same thing; SRF loans or bonds are used to fund capital improvements, and rates and fees pay for operation and maintenance costs. Not much grant money exists. Congressional budget line items are sometimes used.
- Dave Taylor: Any comments about the critical mass of the density of population.
- Craig Lekven: The examples given have centralized urban developed areas, not linear developments along the coast like we have on Maui. This does reduce the cost of transporting wastewater and recycled water.
- Russell Sparks: One major difference for some examples is that potable water rates subsidize the recycled water programs. Here there we don't do that. Sewer rates subsidize.
- Robin Knox: Grant fund availability is reduced, but EPA Alexis Strauss said that headquarters is interested in knowing why Hawaii is leaving grant funding on the table. Why isn't community block grant funding used?
- Cheryl Okuma: Community Block Grant use is limited due to economic criteria — areas like Hana, Molokai, and Lanai can qualify for block grants.
- Dan Clegg: What do we need to do to use recycled water on residential properties?
- Steve Parabolicoli: We have some residential areas using recycled water, but they are all common areas where the landscape is managed by management companies. There are examples in other states where front and backyards of private homes are irrigated with recycled water.
- Craig Lekven: With residential use it takes a lot of staff time to ensure there are no cross connections between the potable and recycled water systems.
- Steve Parabolicoli: St. Petersburg has full staff for this.

- Dan: St. Petersburg residential use was primarily retrofit. Does retrofitting for residential use make sense for Maui?
- Steve Parabolicoli: I don't think so; the County would need a lot of employees and DOH doesn't want residential use.
- Russell: Do people have to use recycled water?
- Steve Parabolicoli: If it's available you are not supposed to irrigate with potable.
- Dave: Dual water systems are needed for residential use. Are the recycled water systems put in with new construction? Or do communities retrofit residential areas?
- Craig Lekven: St. Petersburg retrofitted residential areas for recycled water. It is expensive and complicated to retrofit residential areas. Generally where communities have residential use it's installed with new development.
- Steve Parabolicoli: We contacted all these cities in early days of our reuse program. Maui's ordinance is based on other ordinances. We just need to look at what we've done and just do more of it.
- Joie: What were your criteria for calling a program successful? 100% reuse?
- Craig Lekven: Large programs with public acceptance. None of these programs reuse 100 percent of their water. There are many examples in California where small towns use all their treated wastewater to irrigate dedicated farmland. Storage ponds are used to hold wet season water for use during the dry season. The examples chosen for this presentation are programs that are held up as examples in the recycled water industry at conferences. We chose these particular examples based on our judgment.
- Joie Taylor: Did any achieve 100% reuse.
- Craig Lekven: There are small agencies that recycle 100 percent of their water on dedicated farmland; another example that I am familiar with is Rancho Murrieta outside of Sacramento where they use recycled water to irrigate a golf course and have large storage ponds.
- Joie Taylor: Did you research any programs outside the U.S.?
- Craig Lekven: No
- Joie Taylor: Phosphorous and nitrogen are nutrients and can be contaminants in water.
- Craig Lekven: An example is the Chesapeake Bay, where water quality has been impacted by nutrient loadings and stringent WQ standards have been implemented as a result.
- Howard Hanzawa: During winter storms with low use what are the options? What do these communities do?
- Craig Lekven: Store in seasonal storage reservoirs or discharge to surface water or injection wells. The options are to keep the water in one place for use later, or send it somewhere else. Storage reservoirs are open lined ponds. To achieve 100 percent reuse the seasonal storage reservoir must be sized for the wet weather conditions. We generally use a one-in-10 or one-in-100 year annual precipitation condition and go through site-specific calculations to determine how big a seasonal storage reservoir needs to be.
- Howard Hanzawa: This can be very large?
- Craig Lekven: Usually they are big.
- Dave Taylor : How many Million gallons is this?
- Craig Lekven: On the order of 100 million gallons
- Jeff Pearson: Florida is 185 million gallons.
- Craig Lekven: It's site specific.

Follow-up: On the Kona Coast of the Big Island we have calculated that for 100 percent reuse of 2.0 million gallons per day of recycled water flow would require a seasonal storage reservoir

that holds at least 482 acre feet of water (157 million gallons). The calculation was based on 1-in-10 year precipitation. A reservoir 20 feet deep that was capable of holding this volume of water would have a water surface area of about 24 acres.

- Russell Sparks: Interested in new technology. In our case we have pump stations and long pipelines to centralized treatment plants. We need to pump water to transport it. There is new technology where water is skimmed off and treated closer to where the recycled water is used.

- Craig Lekven: It is called “scalping”. A good example is Los Angeles County Sanitation District, where several upstream wastewater treatment plants create recycled water near where the water is used, and then the solids are put back into sewer and sent to a big centralized treatment plant in Carson for processing.

- Robin Knox: What kind of treatment?

- Craig Lekven: R-1 treatment, either a membrane bioreactor or conventional secondary treatment with filtration and disinfection. Small treatment plants are located out in the community. The solids processing produces the most odor so it’s good to get this out of the community and send it to a larger facility with odor control.

- Russell Sparks: Any idea of the cost? Is it feasible to do this? What is the difference in costs between pipeline and package plant costs?

Craig Lekven: LA County is large system, and the scalping plants are about the same size as our treatment plants here on Maui. An analysis can be done to determine costs and benefits. In general new treatment plants are expensive.

- Dave Taylor: It’s site specific because it’s based on how much water can be produced for what cost compared to the costs to construct pipelines, using a 20-year analysis. We’ve looked into this a little bit.

Comparison of water rates: Potable and recycled water rates for the example successful programs were shown in a table.

- Craig Lekven: Last column on right shows charge for recycled water compared to potable water. This is generally how the recycled water rates are established. Agencies want to create economic incentives to use recycled water instead of potable water. Many agencies charge 70 to 90 percent of the potable water rates for recycled water. The Maui County rates for general users are 70 percent of the potable rates, and there are subsidies for bigger users.

- Steve Parabolicoli: Golf course recycled rates were set on the cost of pumping brackish groundwater. This sets the bar and recycled water price must be lower to provide an incentive.

- Russell Sparks : Do these prices change due to increases in pumping costs?

- Steve Parabolicoli: Yes, there’s been rate increases over the years. With rising electricity costs this needs to be revisited.

VI. Evaluation Criteria—Pair Wise Comparison Activity

Leland Chang: Trying to develop sense of the group in terms of which criteria are of relatively greater importance. Pairwise method is a way to get a sense of what the group collectively believes are the important choices. Pairwise goes back to 1920’s; then later refined. We have over 30 criteria identified and a group of 20 people. Leland discusses rationale and Scott explains the exercise. Responses should reflect members’ organizations’ perspectives. May 13, 2010 deadline for response. Not asking for names, but staff will track emails of returns o know who to follow up with.

VI. Next Steps

Leland Chang: Explains what is to occur over the two months between now and July.

1. Process Pairwise input. Results will be sent to CWG.
2. Another homework request involving rating of strategies identified by CWG during course of brainstorming. These are voluminous and are at different levels. The CWG will be asked to rate these strategies according to how well they satisfy the criteria.
3. First attempt to arrive at recommendations to bring back to the group. One option is to include only strategies from the CWG brainstorm. The other option is to also include ideas from the project team. There are some but not a lot of specific infrastructure proposals in the CWG input. These are things the department has been working on. Should some of these be included in the strategies list?

- Jeff Pearson: If the Department has been working on possible strategies, it would be good for these to be included.

- Dan Clegg: Agrees.

- Jeff Pearson: We can use some way to distinguish between CWG and project team DEM suggestions.

- Dave Taylor: Pair wise is as close to what engineers can come up with to look at things in a holistic fashion. Trying to look at this holistically but based on numbers.

VII. Comments from the Public

- Darla White: Works with Russell. Thanks Craig Lekven for providing examples. Did you look at areas that used a different financial structure and “went outside the box?”

- Craig Lekven: All WW agencies use these mechanisms. Loans, bonds, fees, and water rates are typical mechanisms available. Didn’t query, but can ask this question.

- Darla White: Is this same time when they received grants?

- Craig Lekven: Yes, there was big federal grant program to finance CIP. That’s how Kihei was built and communities did not have to pay for capital cost.

- Darla White: Heard about privatization as creative financing. Success with privatization..... Wanted to frame it in reuse and privatization.

- Cheryl Okuma: Was involved in negotiations that lead to Honolulu’s Honouliuli reclamation facility being privately, financed, designed, constructed and operated. This facility was subsequently transferred to Board of Water Supply which now operates it. There was a policy decision made that recognized the Board of Water Supply as the expert in purveying water, and that was the basis for the operations by the Board of Water Supply today. Wastewater is responsible for operations within the treatment facilities, but once it leaves the site and is treated to appropriate recycled water standards the Board of Water Supply has responsibility.

- Dave Taylor: Public/private partnership does not mean that public does not pay.

- Steve Parabolicoli: Water purveying can be done, but how to maintain that and the cost need to be addressed.

- Russell Sparks: Asks about verification study proviso.

- Steve Parabolicoli: DWS looking at irrigation R-1 and getting information back to WRD. Identifying what can be done and how much each of these projects can cost. This is the cooperation.

- Dave Taylor: The issue of who manages the resource isn’t as big a deal as who is going to pay for it. Issue is how to subsidize the system.

- Toma Craig: Question for Robin Knox -- does she think about urgency of Kahului? Can they be convinced to discharge effluent into wetlands?

- Robin Knox: This would require an NPDES permit and this would have to meet the goals of water quality-based limits. She thinks they could be convinced if it can be shown that the goals are protection and treatment. NPDES standards into surface waters are different and the whole premise of the program is to protect.

- Toma Craig: Can wetlands be enhanced to do a better job? If start putting it in there would be a different nutrient load.

- Robin Knox: Need to be careful when discussing natural water bodies and their ability to assimilate load and treatment process. Can use built wetlands to enhance nutrient removal but need permits etc. If right space is available, could use constructed wetlands for treatment. Could discharge if conditions are right.

Adjourn: 4 p.m.